WHAT IS CLAIMED IS:

1. A method of decreasing an involuntary cull in farm animals comprising: delivering into a tissue of the farm animals an isolated nucleic acid expression construct that encodes a growth-hormone-releasing-hormone ("GHRH") or functional biological equivalent thereof; wherein the involuntary cull comprises infection, disease, morbidity, or mortality of the farm animals.

2. The method of claim 1, wherein the involuntary cull from mortality is decreased from about 20% in farm animals not having the isolated nucleic acid expression construct delivered into a tissue to less than 15% in farm animals having the isolated nucleic acid expression construct delivered.

3. The method of claim 1, wherein the involuntary cull comprises mortality at birth of newborns of the farm animals.

4. The method of claim 1, wherein the involuntary cull comprises post-natal mortality of newborns of the farm animals.

5. The method of claim 1, wherein delivering into the tissue of the farm animals the isolated nucleic acid expression construct is via electroporation method, a viral vector, in conjunction with a carrier, by parenteral route, or a combination thereof.

6. The method of claim 5, wherein the electroporation method comprising:
   (a) penetrating the tissue in the farm animals with a plurality of needle electrodes, wherein the plurality of needle electrodes are arranged in a spaced relationship;
   (b) introducing the isolated nucleic acid expression construct into the tissue between the plurality of needle electrodes; and
   (c) applying an electrical pulse to the plurality of needle electrodes.

7. The method of claim 1, wherein the isolated nucleic acid expression construct is delivered in a single dose.

8. The method of claim 7, wherein the single dose comprises about a 2mg quantity of nucleic acid expression construct.

9. The method of claim 1, wherein the tissue of the farm animals comprise diploid cells.

10. The method of claim 1, wherein the tissue of the farm animals comprise muscle cells.

11. The method of claim 1, wherein the isolated nucleic acid expression construct comprises a HV-GHRH plasmid (SEQID#11).

12. The method of claim 1, wherein the isolated nucleic acid expression construct comprises an optimized pAV0204 bGHRH plasmid (SEQID#19).

13. The method of claim 1, wherein the isolated nucleic acid expression construct is a TI-GHRH plasmid (SEQID#12), TV-GHRH Plasmid (SEQID#13), 15/27/28 GHRH plasmid (SEQID#14), or pSP-wt-GHRH plasmid.

14. The method of claim 1, wherein the isolated nucleic acid expression construct is an optimized pAV0202 mGHRH plasmid (SEQID#17), pAV0203 rGHRH plasmid (SEQID#18), pAV0205 oGHRH plasmid (SEQID#20), pAV0206 cGHRH plasmid (SEQID#21), or pAV0207 pGHRH plasmid (SEQID#28).

15. The method of claim 1, wherein the isolated nucleic acid expression construct further comprises, a transfection-facilitating polypeptide.

16. The method of claim 15, wherein the transfection-facilitating polypeptide comprises a charged polypeptide.

17. The method of claim 15, wherein the transfection-facilitating polypeptide comprises poly-L-glutamate.

18. The method of claim 1, wherein the delivering into the cells of the farm animals the isolated nucleic acid expression construct initiates expression of the encoded GHRH or functional biological equivalent thereof.

19. The method of claim 1, wherein the encoded GHRH is a biologically active polypeptide; and the encoded functional biological equivalent of GHRH is a polypeptide that has been engineered to contain a distinct amino acid sequence while simultaneously having similar or improved biologically activity when compared to the GHRH polypeptide.

20. The method of claim 1, wherein the encoded GHRH or functional biological equivalent thereof is of formula (SEQID No: 6):

-X_1-X_2–DAIFTNSYRKVL-X_3–QLSARKLLQDI-X_4-X_5–RQQGERNQEQGA-OH

wherein the formula has the following characteristics:

X_1 is a D-or L-isomer of the amino acid tyrosine ("Y"), or histidine ("H");

X_2 is a D-or L-isomer of the amino acid alanine ("A"), valine ("V"), or isoleucine ("I");

X_3 is a D-or L-isomer of the amino acid alanine ("A") or glycine ("G");

X_4 is a D-or L-isomer of the amino acid methionine ("M"), or leucine ("L");

X_5 is a D-or L-isomer of the amino acid serine ("S") or asparagine ("N");

or a combination thereof.

21. The method of claim 1, wherein the farm animals comprises ruminant animals, food animals, or work animals.

22. The method of claim 1, wherein the farm animals comprise dairy cows.

23. A method of improving a body condition score ("BCS") in farm animals comprising: delivering into a tissue of the farm animals an isolated nucleic acid expression construct that encodes a growth-hormone-releasing-hormone ("GHRH") or functional biological equivalent thereof; wherein the BSC is an aid used to evaluate an overall nutritional state of the farm animals.

24. The method of claim 23, wherein delivering into the tissue of the farm animals the isolated nucleic acid expression construct is via electroporation method, a viral vector, in conjunction with a carrier, by parenteral route, or a combination thereof.

25. The method of claim 24, wherein the electroporation method comprising:

(a) penetrating the tissue in the farm animals with a plurality of needle electrodes, wherein the plurality of needle electrodes are arranged in a spaced relationship;

(b) introducing the isolated nucleic acid expression construct into the tissue between the plurality of needle electrodes; and

(c) applying an electrical pulse to the plurality of needle electrodes.

26. The method of claim 23, wherein the isolated nucleic acid expression construct is delivered in a single dose.

27. The method of claim 26, wherein the single dose comprises about a 2mg quantity of nucleic acid expression construct.

28. The method of claim 26, wherein the tissues of the farm animals comprise diploid cells.

29. The method of claim 26, wherein the tissues of the farm animals comprise muscle cells.

30. The method of claim 26, wherein the isolated nucleic acid expression construct comprises a HV-GHRH plasmid (SEQID#11).

31. The method of claim 26, wherein the isolated nucleic acid expression construct comprises an optimized pAV0204 bGHRH plasmid (SEQID#19).

32. The method of claim 26, wherein the isolated nucleic acid expression construct is a TI-GHRH plasmid (SEQID#12), TV-GHRH Plasmid (SEQID#13), 15/27/28 GHRH plasmid (SEQID#14), or pSP-wt-GHRH plasmid.

33. The method of claim 26, wherein the isolated nucleic acid expression construct is an optimized pAV0202 mGHRH plasmid (SEQID#17), pAV0203 rGHRH plasmid (SEQID#18), pAV0205 oGHRH plasmid (SEQID#20), pAV0206 cGHRH plasmid (SEQID#21), or pAV0207 pGHRH plasmid (SEQID#28).

34. The method of claim 26, wherein the isolated nucleic acid expression construct further comprises, a transfection-facilitating polypeptide.

35. The method of claim 34, wherein the transfection-facilitating polypeptide comprises a charged polypeptide.

36. The method of claim 34, wherein the transfection-facilitating polypeptide comprises poly-L-glutamate.

37. The method of claim 26, wherein the delivering into the cells of the farm animals the isolated nucleic acid expression construct initiates expression of the encoded GHRH or functional biological equivalent thereof.

38. The method of claim 26, wherein the encoded GHRH is a biologically active polypeptide; and the encoded functional biological equivalent of GHRH is a polypeptide that has been engineered to contain a distinct amino acid sequence while simultaneously having similar or improved biologically activity when compared to the GHRH polypeptide.

39. The method of claim 26, wherein the encoded GHRH or functional biological equivalent thereof is of formula (SEQID No: 6):

$-X_1-X_2$–DAIFTNSYRKVL-X_3–QLSARKLLQDI-X_4-X_5–RQQGERNQEQGA-OH

wherein the formula has the following characteristics:

X_1 is a D-or L-isomer of the amino acid tyrosine ("Y"), or histidine ("H");

X_2 is a D-or L-isomer of the amino acid alanine ("A"), valine ("V"), or isoleucine ("I");

X_3 is a D-or L-isomer of the amino acid alanine ("A") or glycine ("G");

X_4 is a D-or L-isomer of the amino acid methionine ("M"), or leucine ("L");

X_5 is a D-or L-isomer of the amino acid serine ("S") or asparagine ("N");

or a combination thereof.

40. The method of claim 26, wherein the farm animals comprises a ruminant animals, a food animals, or a work animals.

41. The method of claim 26, wherein the farm animals comprises a pig, sheep, goat or chicken.

42. The method of claim 26, wherein the farm animals comprise bovine.

43. The method of claim 26, wherein the farm animals comprise dairy cows.

44. A method of increasing milk production in a dairy cow comprising: delivering into muscle tissues of the dairy cow an isolated nucleic acid expression construct that encodes a growth-hormone-releasing-hormone ("GHRH") or functional biological equivalent thereof;

wherein

delivering into the tissue of the farm animals the isolated nucleic acid expression construct is via electroporation, a viral vector, in conjunction with a carrier, by parenteral route, or a combination thereof; and

the isolated nucleic acid expression construct is delivered in a single dose.

45. The method of claim 44, wherein the increase in milk production is increased from about 8% to about 18% in farm animals having the isolated nucleic acid expression construct delivered when compared to animals not having the isolated nucleic acid expression construct delivered.

46. The method of claim 44, wherein the electroporation method comprising:

(a) penetrating the tissue in the farm animals with a plurality of needle electrodes, wherein the plurality of needle electrodes are arranged in a spaced relationship;

(b) introducing the isolated nucleic acid expression construct into the tissue between the plurality of needle electrodes; and

(c) applying an electrical pulse to the plurality of needle electrodes.

47. The method of claim 44, wherein the single dose comprises about a 2mg quantity of nucleic acid expression construct.

48. The method of claim 44, wherein the isolated nucleic acid expression construct comprises a HV-GHRH plasmid (SEQID#11).

49. The method of claim 44, wherein the isolated nucleic acid expression construct comprises an optimized pAV0204 bGHRH plasmid (SEQID#19).

50. The method of claim 44, wherein the isolated nucleic acid expression construct is a TI-GHRH plasmid (SEQID#12), TV-GHRH Plasmid (SEQID#13), 15/27/28 GHRH plasmid (SEQID#14), or pSP-wt-GHRH plasmid.

51. The method of claim 44, wherein the isolated nucleic acid expression construct is an optimized pAV0202 mGHRH plasmid (SEQID#17), pAV0203 rGHRH plasmid (SEQID#18), pAV0205 oGHRH plasmid (SEQID#20), pAV0206 cGHRH plasmid (SEQID#21), or pAV0207 pGHRH plasmid (SEQID#28).

52. The method of claim 44, wherein the isolated nucleic acid expression construct further comprises, a transfection-facilitating polypeptide.

53. The method of claim 52, wherein the transfection-facilitating polypeptide comprises a charged polypeptide.

54. The method of claim 52, wherein the transfection-facilitating polypeptide comprises poly-L-glutamate.

55. The method of claim 44, wherein the delivering into the cells of the farm animals the isolated nucleic acid expression construct initiates expression of the encoded GHRH or functional biological equivalent thereof.

56. The method of claim 44, wherein the encoded GHRH is a biologically active polypeptide; and the encoded functional biological equivalent of GHRH is a polypeptide that has been engineered to contain a distinct amino acid sequence while simultaneously having similar or improved biologically activity when compared to the GHRH polypeptide.

57. The method of claim 44, wherein the encoded GHRH or functional biological equivalent thereof is of formula (SEQID No: 6):

$-X_1-X_2$–DAIFTNSYRKVL-X_3–QLSARKLLQDI-X_4-X_5–RQQGERNQEQGA-OH

wherein the formula has the following characteristics:

X_1 is a D-or L-isomer of the amino acid tyrosine ("Y"), or histidine ("H");

X_2 is a D-or L-isomer of the amino acid alanine ("A"), valine ("V"), or isoleucine ("I");

X_3 is a D-or L-isomer of the amino acid alanine ("A") or glycine ("G");

X_4 is a D-or L-isomer of the amino acid methionine ("M"), or leucine ("L");

X_5 is a D-or L-isomer of the amino acid serine ("S") or asparagine ("N");

or a combination thereof.

58. A method of decreasing an involuntary cull in farm animals comprising: delivering into a muscle tissue of the farm animals an isolated nucleic acid expression construct that encodes a growth-hormone-releasing-hormone ("GHRH") or functional biological equivalent thereof; wherein;

the involuntary cull comprises infection, disease, morbidity, or mortality of the farm animals;

delivering is via an *in vivo* electroporation method;

the isolated nucleic acid expression construct is delivered in a single dose; and

the encoded GHRH or functional biological equivalent thereof is of formula (SEQID No: 6):

$-X_1-X_2$–DAIFTNSYRKVL-X_3–QLSARKLLQDI-X_4-X_5–RQQGERNQEQGA-OH

wherein the formula has the following characteristics:

X_1 is a D-or L-isomer of the amino acid tyrosine ("Y"), or histidine ("H");

X_2 is a D-or L-isomer of the amino acid alanine ("A"), valine ("V"), or isoleucine ("I");

X_3 is a D-or L-isomer of the amino acid alanine ("A") or glycine ("G");

X_4 is a D-or L-isomer of the amino acid methionine ("M"), or leucine ("L");

X_5 is a D-or L-isomer of the amino acid serine ("S") or asparagine ("N");

or a combination thereof.

59. The method of claim 58, wherein the involuntary cull comprises mortality at birth of newborns of the farm animals.

60. The method of claim 58, wherein the involuntary cull further comprises post-natal mortality of newborns of the farm animals.

61. The method of claim 58, wherein the single dose comprises about a 2mg quantity of nucleic acid expression construct.

62. The method of claim 58, wherein the isolated nucleic acid expression construct is a HV-GHRH plasmid (SEQID#11), or an optimized pAV0204 bGHRH plasmid (SEQID#19).

63. The method of claim 58, wherein the isolated nucleic acid expression construct is a TI-GHRH plasmid (SEQID#12), TV-GHRH Plasmid (SEQID#13), 15/27/28 GHRH plasmid (SEQID#14), pSP-wt-GHRH plasmid, pAV0202 mGHRH plasmid (SEQID#17), pAV0203 rGHRH plasmid (SEQID#18), pAV0205 oGHRH plasmid (SEQID#20), pAV0206 cGHRH plasmid (SEQID#21), or pAV0207 pGHRH plasmid (SEQID#28).

64. The method of claim 58, wherein the isolated nucleic acid expression construct further comprises, poly-L-glutamate.

65. The method of claim 58, wherein the farm animals comprises a bovine.

66. A method of improving a body condition score ("BCS") in farm animals comprising: delivering into a muscle tissue of the farm animals an isolated nucleic acid expression construct that encodes a growth-hormone-releasing-hormone ("GHRH") or functional biological equivalent thereof;

wherein:

the BSC is an aid used to evaluate an overall nutritional state of the farm animals;

delivering is via an *in vivo* electroporation method;

the isolated nucleic acid expression construct is delivered in a single dose; and

the encoded GHRH or functional biological equivalent thereof is of formula (SEQID No: 6):

-X_{-1}-X_2–DAIFTNSYRKVL-X_3–QLSARKLLQDI-X_4-X_5–RQQGERNQEQGA-OH

wherein the formula has the following characteristics:

X_1 is a D-or L-isomer of the amino acid tyrosine ("Y"), or histidine ("H");

X_2 is a D-or L-isomer of the amino acid alanine ("A"), valine ("V"), or isoleucine ("I");

X_3 is a D-or L-isomer of the amino acid alanine ("A") or glycine ("G");

X_4 is a D-or L-isomer of the amino acid methionine ("M"), or leucine ("L");

X_5 is a D-or L-isomer of the amino acid serine ("S") or asparagine ("N");

or a combination thereof.

67. The method of claim 66, wherein the single dose comprises about a 2mg quantity of nucleic acid expression construct.

68. The method of claim 66, wherein the isolated nucleic acid expression construct is a HV-GHRH plasmid (SEQID#11), or an optimized pAV0204 bGHRH plasmid (SEQID#19).

69. The method of claim 66, wherein the isolated nucleic acid expression construct is a TI-GHRH plasmid (SEQID#12), TV-GHRH Plasmid (SEQID#13), 15/27/28 GHRH plasmid (SEQID#14), pSP-wt-GHRH plasmid, pAV0202 mGHRH plasmid (SEQID#17), pAV0203 rGHRH plasmid (SEQID#18), pAV0205 oGHRH plasmid (SEQID#20), pAV0206 cGHRH plasmid (SEQID#21), or pAV0207 pGHRH plasmid (SEQID#28).

70. The method of claim 66, wherein the isolated nucleic acid expression construct further comprises, poly-L-glutamate.

71. The method of claim 66, wherein the farm animals comprise bovine.

72. A method of increasing milk production in a dairy cow comprising: delivering into tissues of the dairy cow an isolated nucleic acid expression construct that encodes a growth-hormone-releasing-hormone ("GHRH") or functional biological equivalent thereof;

wherein:

delivering is via an *in vivo* electroporation method;

the isolated nucleic acid expression construct is delivered in a single dose; and

the encoded GHRH or functional biological equivalent thereof is of formula (SEQID No: 6):

$-X_1-X_2$–DAIFTNSYRKVL-X_3–QLSARKLLQDI-X_4-X_5–RQQGERNQEQGA-OH

wherein the formula has the following characteristics:

X_1 is a D-or L-isomer of the amino acid tyrosine ("Y"), or histidine ("H");

X_2 is a D-or L-isomer of the amino acid alanine ("A"), valine ("V"), or isoleucine ("I");

X_3 is a D-or L-isomer of the amino acid alanine ("A") or glycine ("G");

X_4 is a D-or L-isomer of the amino acid methionine ("M"), or leucine ("L");

X_5 is a D-or L-isomer of the amino acid serine ("S") or asparagine ("N");

or a combination thereof.

73. The method of claim 72, wherein the single dose comprises about a 2mg quantity of nucleic acid expression construct.

74. The method of claim 72, wherein the isolated nucleic acid expression construct is a HV-GHRH plasmid (SEQID#11), or an optimized pAV0204 bGHRH plasmid (SEQID#19).

75. The method of claim 72, wherein the isolated nucleic acid expression construct is a TI-GHRH plasmid (SEQID#12), TV-GHRH Plasmid (SEQID#13), 15/27/28 GHRH plasmid (SEQID#14), pSP-wt-GHRH plasmid, pAV0202 mGHRH plasmid (SEQID#17), pAV0203 rGHRH plasmid (SEQID#18), pAV0205 oGHRH plasmid (SEQID#20), pAV0206 cGHRH plasmid (SEQID#21), or pAV0207 pGHRH plasmid (SEQID#28).

76. The method of claim 72, wherein the isolated nucleic acid expression construct further comprises, poly-L-glutamate.

77. A method of decreasing an involuntary cull in farm animals comprising: delivering into the farm animals a growth hormone secretagogue molecule or functional biological equivalent thereof; wherein the involuntary cull comprises infection, disease, morbidity, or mortality of the farm animals; and the growth hormone secretagogue molecule or functional biological equivalent thereof facilitates growth hormone ("GH") secretion in the farm animal.

78. The method of claim 77, wherein delivering into the tissue of the farm animals the growth hormone secretagogue molecule is via an electroporation method, a viral vector or nucleic acid expression construct, in conjunction with a carrier, by parenteral route, orally, or a combination thereof.

79. The method of claim 77, wherein the involuntary cull comprises mortality at birth of newborns of the farm animals.

80. The method of claim 77, wherein the involuntary cull comprises post-natal mortality of newborns of the farm animals.

81. The method of claim 77, wherein the growth hormone secretagogue molecule comprises a growth hormone releasing hormone ("GHRH") or functional biological equivalent thereof.

82. The method of claim 77, wherein growth hormone secretagogue comprises an isolated nucleic acid expression construct that encodes the growth hormone releasing hormone ("GHRH") or functional biological equivalent thereof.

83. The method of claim 81, wherein the isolated nucleic acid expression construct comprises a HV-GHRH plasmid (SEQID#11).

84. The method of claim 81, wherein the isolated nucleic acid expression construct is an optimized pAV0204 bGHRH plasmid (SEQID#19), TI-GHRH plasmid (SEQID#12), TV-GHRH Plasmid (SEQID#13), 15/27/28 GHRH plasmid (SEQID#14), pSP-wt-GHRH plasmid, an optimized pAV0202 mGHRH plasmid (SEQID#17), pAV0203 rGHRH plasmid (SEQID#18), pAV0205 oGHRH plasmid (SEQID#20), pAV0206 cGHRH plasmid (SEQID#21), or pAV0207 pGHRH plasmid (SEQID#28).

85. The method of claim 81, wherein the encoded GHRH is a biologically active polypeptide; and the encoded functional biological equivalent of GHRH is a polypeptide that has been engineered to contain a distinct amino acid sequence while simultaneously having similar or improved biologically activity when compared to the GHRH polypeptide.

86. The method of claim 81, wherein the encoded GHRH or functional biological equivalent thereof is of formula (SEQID No: 6):

$-X_1-X_2$–DAIFTNSYRKVL-X_3–QLSARKLLQDI-X_4-X_5–RQQGERNQEQGA-OH

wherein the formula has the following characteristics:

X_1 is a D-or L-isomer of the amino acid tyrosine ("Y"), or histidine ("H");

X_2 is a D-or L-isomer of the amino acid alanine ("A"), valine ("V"), or isoleucine ("I");

X_3 is a D-or L-isomer of the amino acid alanine ("A") or glycine ("G");

X_4 is a D-or L-isomer of the amino acid methionine ("M"), or leucine ("L");

X_5 is a D-or L-isomer of the amino acid serine ("S") or asparagine ("N"); or a combination thereof.

87. The method of claim 77, wherein the farm animals comprises ruminant animals, food animals, or work animals.

88. The method of claim 77, wherein the farm animals comprise dairy cows.

89. A method of improving a body condition score ("BCS") in farm animals comprising: delivering into the farm animals a growth hormone secretagogue molecule or functional biological equivalent thereof; wherein the BSC is an aid used to evaluate an overall nutritional state of the farm animals, and the growth hormone secretagogue molecule or functional biological equivalent thereof facilitates growth hormone ("GH") secretion in the farm animal.

90. The method of claim 89, wherein delivering into the tissue of the farm animals the isolated nucleic acid expression construct is via electroporation method, a viral vector, in conjunction with a carrier, by parenteral route, orally, or a combination thereof.

91. The method of claim 89, wherein the growth hormone secretagogue molecule comprises a growth hormone releasing hormone ("GHRH") or functional biological equivalent thereof.

92. The method of claim 89, wherein growth hormone secretagogue comprises an isolated nucleic acid expression construct that encodes the growth hormone releasing hormone ("GHRH") or functional biological equivalent thereof.

93. The method of claim 89, wherein growth hormone secretagogue comprises an isolated nucleic acid expression construct that encodes the growth hormone releasing hormone ("GHRH") or functional biological equivalent thereof.

94. The method of claim 93, wherein the isolated nucleic acid expression construct comprises a HV-GHRH plasmid (SEQID#11).

95. The method of claim 93, wherein the isolated nucleic acid expression construct is an optimized pAV0204 bGHRH plasmid (SEQID#19), TI-GHRH plasmid (SEQID#12), TV-GHRH Plasmid (SEQID#13), 15/27/28 GHRH plasmid (SEQID#14), pSP-wt-GHRH plasmid, an optimized pAV0202 mGHRH plasmid (SEQID#17), pAV0203 rGHRH plasmid (SEQID#18), pAV0205 oGHRH plasmid (SEQID#20), pAV0206 cGHRH plasmid (SEQID#21), or pAV0207 pGHRH plasmid (SEQID#28).

96. The method of claim 93, wherein the encoded GHRH is a biologically active polypeptide; and the encoded functional biological equivalent of GHRH is a polypeptide that has been engineered to contain a distinct amino acid sequence while simultaneously having similar or improved biologically activity when compared to the GHRH polypeptide.

97. The method of claim 93, wherein the encoded GHRH or functional biological equivalent thereof is of formula (SEQID No: 6):

$-X_1-X_2$–DAIFTNSYRKVL-X_3–QLSARKLLQDI-X_4-X_5–RQQGERNQEQGA-OH

wherein the formula has the following characteristics:

X_1 is a D-or L-isomer of the amino acid tyrosine ("Y"), or histidine ("H");

X_2 is a D-or L-isomer of the amino acid alanine ("A"), valine ("V"), or isoleucine ("I");

X_3 is a D-or L-isomer of the amino acid alanine ("A") or glycine ("G");

X_4 is a D-or L-isomer of the amino acid methionine ("M"), or leucine ("L");

X_5 is a D-or L-isomer of the amino acid serine ("S") or asparagine ("N");

or a combination thereof.

98. The method of claim 89, wherein the farm animals comprises ruminant animals, food animals, or work animals.

99. The method of claim 89, wherein the farm animals comprise dairy cows.